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Foresight Methods: Ensuring Performance Excellence Under High Volatility and Uncertainty

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Foresight Methods: Ensuring Performance Excellence Under High Volatility and Uncertainty

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Abstract: Foresight, or strategic foresight, is a set of methods and approaches that enable researchers and decision makers to think systematically about the future, and to plan and perform under conditions of high volatility and deep uncertainty. Unlike forecasting, which involves simplifying assumptions to make projections and predictions, foresight involves the consideration of different plausible futures.

Modern foresight first gained currency in the U.S. military in the early Cold War period and developed further in the 1960s and 1970s through the corporate scenario work of Shell Oil. The practice has grown tremendously in the past decade, as government agencies and private sector actors alike grapple with decision making under conditions of deep uncertainty and high volatility generated by factors such as climate change, technological developments, and shifting political orders.

This article presents an overview of foresight techniques, their strengths and limitations, and their application to various contexts of decision making. It concludes with recommendations on ways that scholars and practitioners can strengthen the research and practice of strategic foresight given the scale of challenges we face, from the local to the global.

INTRODUCTION

We are at an important inflection point in the research and development of strategic foresight in organizational planning and public administration. Massive disruptions from COVID-19, the growing frequency of extreme weather events, rapid shifts in artificial intelligence and public information environments, and unexpected eruptions of domestic and global conflict all present challenges to our long-established and conventional methods of policy analysis and planning. Simplifying assumptions, short-term projections, and causal elegance—these approaches still play an important role in helping organizations analyze, plan, and implement solutions in an effective manner. At the same time, conventional methods of public policy and public administration analysis are ill suited to help institutions and organizations navigate conditions of high volatility and deep uncertainty.

Strategic foresight, or foresight, can be summarized as "the capacity to think systematically about the future to inform strategy development." (White House Office of Management and Budget 2024) It is a recommended best practice for agency strategic plans by the U.S. federal government[i] as well as by other national governments (UK Government Office for Science 2023; Government of Wales 2015; Dreyer and Stang 2013) and major international agencies (OECD 2024; United Nations 2024).

In contrast to forecasting, which involves predicting a likely future with a demarcated range of uncertainty, foresight involves planning for a range of multiple futures with varying degrees of plausibility. Scenarios are perhaps the most commonly used method in strategic foresight, but there are a range of other tools used by policy scholars and practitioners alike, including horizon scanning, trend analysis, developing futures wheels, and threat casting.[ii]

As the Organization for Economic Co-operation and Development notes, strategic foresight encourages public and private agencies to move beyond a fixation on predicting the future, and to analyze different plausible futures to ensure policy effectiveness. As the OECD's Strategic Foresight Unit explains, "Rather than making predictions based on linear extrapolation of past and current trends, foresight cultivates the capacity to anticipate alternative futures and an ability to imagine multiple and non-linear possible consequences." (OECD 2024)

Modern techniques of strategic foresight trace their roots to the end of World War II when the U.S. government sought to understand and plan for varying scenarios for the next international order. As Iana Dreyer and Gerald Strang note in their 2013 article, the U.S. military had developed analytical tools during World War II to anticipate possible events, including "not only military events, but anything that could affect military affairs, such as technological, demographic and political trends." (Dreyer and Stang 2013) The RAND Corporation continued developing this work in the postwar period, including developing the Delphi method (Dalkey, Brown, and Cochran 1969) and scenario building. These foresight methods helped anticipate and structure U.S. terms of engagement with the Soviet Union during the Cold War, and were later adapted and adopted by the private sector, including most prominently by the Shell Oil corporation during the 1960s and its development of scenario methods (we discuss more about the development and utilization of foresight tools by Shell later).

More recently, foresight techniques have gained significant traction in intergovernmental settings such as the OECD, which has a Strategic Foresight Unit in its Office of Secretary General that helps convene an OECD-wide Government Foresight Community (OECD 2024), and with the United Nations, with prioritization in offices such as the Office of Secretary General, the UN Development Program, and UNESCO, which is home to the Futures Lab, a "network that empowers the UN System and beyond to use futures thinking and strategic foresight in planning, policy- and decision-making." (United Nations 2024) National government agencies have also dived deeper into foresight with the development of a Future Generations Commissioner in Wales, (Government of Wales 2015) the development of foresight capabilities across various government agencies in Portugal, (Monteiro 2022) and various other national and local jurisdictions ranging from Canterbury, New Zealand to Oman.[iii]

VARIETIES OF FORESIGHT

Strategic foresight, or foresight, is a set of analytic and applied methods that are borne of necessity. Under conditions of high volatility and deep uncertainty, standard tools of policy analysis and planning are inadequate to assist with understanding and decision making. As Henry Brady and Aditi Chugh note in their white paper on the value of foresight for policy analysis,

> It is clear that we cannot always produce models for thinking definitely about the future. Sometimes we have to make do with large pieces of the puzzle missing. We cannot fully know what outcomes are possible. We cannot clearly

> state our preferences, partly because they are the preferences of future generations. We cannot fully describe causal relationships or obtain the probabilities of events, and we cannot know all the policy alternatives that are possible. But we can make enough inroads on these difficulties to do a better job of preparing for and constructing the future we want. (Brady and Chugh 2023)

As Brady and Chugh further note, traditional methods of policy analysis focus on statistical uncertainty, which involves understanding the probability distribution of outcomes, while foresight methods do a much better job of understanding scenario uncertainty, which Warren Walker and colleagues describe as conditions where "there is a range of possible outcomes, but the mechanisms leading to these outcomes are not well understood, and it is, therefore, not possible to formulate the probability of any one outcome occurring." (Walker et al. 2003) It is important to note that this concept of scenario uncertainty is broader than the particular foresight method of scenario-based planning, which we discuss further below.

Scholars and practitioners alike have developed a range of methods to better understand, plan for, and evaluate solutions to problems under conditions of scenario uncertainty in its broadest sense. Instead of making strong simplifying assumptions to make the problem tractable for predictive purposes—or avoiding analyzing these problems altogether given their complexity —foresight methods embrace causal complexity and uncertainty and lean into techniques that vary in their level of speculation, creative imagination, and statistical reliance in order to provide helpful guidance to decision makers in a range of settings, as discussed earlier.

Foresight methods vary in their approach, from qualitative analytical methods such as horizon scanning and scenario-based planning, to more quantitative simulation methods like the Robust Decision Making (RDM) method pioneered by RAND, to more imaginative methods such as visioning and Future Design. Below is a summary of each method and the conditions under which it can add value to planning and implementation. Multi-method toolkits, such as the *Futures Toolkit for Policymakers and Analysts* developed by the UK Government Office for Science (UK Government Office for Science 2024) the U.N. Development Programme's *Foresight Playbook*, (United Nations Development Programme 2022) and *Beyond Strategic Planning: A Foresight Toolkit for Decision Makers* by the California 100 Initiative (Glenday et al. 2023) provide greater details on these various methods, and step-by-step guides for implementation by practitioners.

Horizon scanning is an exploratory method that is often used in the early stages of more complex foresight exercises. Horizon scanning was initially developed by the UK Government in 2004 as part of its foresight program, (Schultz 2006) and is defined as "the systematic collection of insights on emerging trends and weak signals of change to identify potential threats, risks and opportunities." (UK Government Office for Science 2024) Horizon scans, which include both focused and unfocused searches for patterns and insights, tend to work better with participants from a variety of sectors or perspectives, and may entail missing out on important signals, trends, and drivers of change.

In a 2011 review article, Ozcan Saritas and Jack Smith summarize *weak signals* as "the early signs of possible but not confirmed changes that may later become more

significant indicators of critical forces for development, threats, business and technical innovation." (Saritas and Smith 2011) The authors offer the first mention of global warming in the 1980s as an example of weak signals. *Trends* are more enduring shifts that are often driven by innovations in technology and knowledge, and usually last many years and have global reach. Finally, *drivers* are factors or mechanisms that are generating these trends, and form the building blocks for constructing qualitative 2 x 2 scenarios. (UK Government Office for Science 2024)

Scenario-based planning is an exploration of alternate ways that the future may develop, with contextual factors—built on compelling narratives in the case of qualitative scenario development—that constrain, enable, or otherwise shape the outcomes of a particular strategy or tactic. One common method for scenario-based planning is the 2 x 2 framework that is built on two axes of critical uncertainty that have been developed through a Driver Mapping process. (Glenday et al. 2023) Critical uncertainties are derived from drivers that rank high in terms of their levels of uncertainty over a particular time frame, and that also rank high in terms of their impact on outcomes (for example, a critical uncertainty for the future of elementary education is whether the use of artificial intelligence in K-6 schools will be low or high, with significant impacts on the ability of schools to offer personalized instruction). Another axis of critical uncertainty in elementary education could relate to whether commitments to social equity in student achievement are low or high. Putting these two axes together will generate four scenarios, or "worlds," that structure subsequent strategy development, such as through the utilization of SWOT analyses or policy

stress-testing on a variety of strategies, a futures method that is sometimes referred to as "wind tunneling." (Glenday et al. 2023)

There are specialized versions of scenario-based planning such as threatcasting, which bring together narrative methods such as science fiction as well as research from technology, social science, and cultural history to create potential futures that are "focused on the fiction of a person in a place doing a thing… By placing the threats into a fictional story, it allows decision makers and practitioners to imagine what needs to be done today as well as four and eight years into the future to empower or disrupt the targeted future scenario." (Johnson, Vanatta, and Coon 2021)

Scenario-based planning can also rely on quantitative approaches that produce hundreds or even thousands of simulated futures. The RAND Corporation has pioneered a quantitative scenario approach called Robust Decision Making (RDM) that involves vulnerability analysis and tradeoff analysis across a wide range of simulated futures, which then can be used to produce a new set of strategies and simulated futures in order to arrive at a mutually agreed upon, optimal solution. (Lempert 2019) For example, RAND has worked with water agencies to make better decisions about infrastructure investments by simulating hundreds of possible futures based on variation in climate conditions, demand from existing customers, and demand from new customers. (Groves et al. 2021)

Visioning is a process whereby participants articulate and understand their preferred futures, including those that are free from the present-day constraints of technological

and political feasibility. Visioning can be used during the initial scoping or agenda-setting stage of a foresight project, or during the investigation stage in order to expand the set of scenarios for consideration. (Glenday et al. 2023) Visioning exercises can take the form of aspirational news headlines that represent the "wildest dreams" of success on an issue, and participants can include decision makers, other team members, issue stakeholders, and the general public. Visioning can also be anchored in other aspirational exercises for institutions and organizations, including the development of "big, hairy, audacious goals" that stretch beyond a 10-year period and that apply to the entire organization. (Collins and Porras 1996; Lindgren and Bandhold 2009) Finally, visioning can also include creative techniques such as storytelling, installation art and other immersive experiences to portray a compelling, shared set of aspirations about the future. The Sustainable Singapore Blueprint, (Singapore National Climate Change Secretariat 2014) the UK's Food 2030 strategy, (UK Department for Environment, Food and Rural Affairs 2010) and the California 100 Initiative (2023) all utilized visioning exercises to build strategies and roadmaps for long-term futures.

Future Design is a relatively new foresight method that invites participants to take on the role of imaginary future generations, with the aim of "helping groups improve their capacity for empathy and creative problem solving, and to better account for the needs of both current and future generations." (Brooks Masters and Ramakrishnan 2024) The technique was initially conceived by Tatsuyoshi Saijo, a Japanese

economist and further developed and adopted by Keishiro Hara and colleagues at the Future Design Lab at Osaka University. The first applied experiment on Future Design took place in the Japanese town of Yahaba in 2015, (Saijo 2020; Hara et al. 2019) with a town hall meeting that invited participants to take on the role of the town's residents in 2060 in order to deliberate and negotiate over important policy choices that would affect the town's current generations as well as future generations. Since then, the technique has spread to many other cities in Japan, and has also been adapted to corporate settings including strategies involving research and development (R&D) decisions. (Hara, Kuroda, and Nomaguchi 2023)

USE CASES FOR APPLIED FORESIGHT

So far, we have laid out a brief introduction to foresight, including a discussion of its history and development since the 1940s, its growing adoption over the past decade, and an overview of several foresight methods being used today. Beyond an academic understanding of the tools and methods of foresight, it also is helpful to have a deeper exploration of examples where organizations have successfully deployed foresight to solve a range of complex problems. Each of the use cases below illustrates how an institution or organization used foresight to solve a particular problem or capture a strategic opportunity, and also how the organization has continued to use and operationalize foresight methods in its practice.

Shell Oil

Perhaps the most well known, and longest established, foresight program is the work of Shell (formerly Royal Dutch Shell), which increased the sophistication of scenario-based planning from a set of "analytic devices" to a more explicit methodology for planning and decision making (Van der Heijden 1996; 2011).[iv] While all other oil companies during the 1960s relied on extrapolations of short-term forecasts to guide their strategic decisions, Shell developed a scenario technique that would enable the company, whose Committee on Managing Directions depended on consensus views among a diverse set of decision makers, to more quickly adapt and respond to major shifts in global political conditions. As Kees van der Heijden, one of the chief architects of Shell's foresight approach, later wrote in his 1996 book on scenarios, internal planning for a potential major disruption in oil supplies enabled the company to build a stronger case for investing more heavily in the production of refined gasoline, an expensive proposition given the robust demand for heavier fuel oil in Europe through the early 1970s. Thus, when the Yom Kippur War and subsequent curtailment in OPEC oil production prompted a massive spike in global oil prices, Shell was prepared to weather the shocks much better than the rest of its competitors.

Other corporations soon began to take note, and by the mid-1970s, a majority of Fortune 1000 companies had incorporated scenarios in some meaningful way into their strategy development. (Lindgren and Bandhold 2009) Since then, foresight has waxed and waned in prioritization and resource allocation within corporate settings, but Shell continues to maintain its Shell Scenarios team, a multidisciplinary team "with expertise in economics, political analysis, energy analysis, socio-cultural change, climate, scenario building and

communications," (Shell Global 2024) and continues to provide guidance and inspiration to the field on pragmatic applications of foresight in various public and private organizational settings.

State of Arizona: COVID-19

In March 2020 at the onset of the COVID-19 pandemic. Arizona Department of Health Services (ADHS) and Arizona State University undertook a monitoring and modeling exercise to understand the possible impact of the pandemic on the health services, (e.g. hospitals, clinics, mortuaries) and critical state infrastructure (e.g. water, power, transportation). The traditional approach to modeling looked at the existing data pertaining to morbidity, mortality and hospitalization. The team lead, ASU's Dr. Tim Lant, a mathematical epidemiologist, began the mathematical and statistical models for the pandemic's impact on state services.

Quickly the team saw that they were challenged by the limited quantitative data set they had access to and needed to model a broader range of possible and potential futures. Additionally, they understood that they needed to expand the data set and factors that they were using to include social and cultural activity, economic indicators, media and social media coverage and other qualitative inputs.

The team employed the Threatcasting foresight method (Johnson, Vanatta, and Coon 2021) to gather these multidisciplinary inputs and worked with practitioners via a virtual workshop to look out 5 years and model a range of possible and potential futures. Once these futures or destabilization scenarios were defined the team could then model what indicators could show

that a specific threat was beginning to manifest. This allowed the team to take the qualitative future models and turn them into quantitative near-term and mid-term data points.

The result of the exercise provided a prioritized list of five well defined threat futures or destabilization scenarios, along with the specific indicators for when the local and state infrastructure could be moving towards these possible futures. Misinformation around vaccine skepticism and mass gatherings around political rallies were identified as two of the important qualitative drivers. Additionally, the method identified the "who" was getting hospitalized and "where" they lived mattered to the level of destabilization that the state infrastructure might experience.

This framework provided local, city and state leaders to make informed decisions and reactions to the progression of the pandemic on a state, city and community level. ADHS is creating a historical archive of the overall response, and the project's efforts will be included. The success of the collaboration led to the Oregon Health authority and Oregon Health and Science University also adopting the models and using it for tier decision making as well.

U.S. Coast Guard

In the U.S. government, the most widely cited success story comes from the Coast Guard (USCG). The USCG began its foresight program in 1998 with a strategic exercise called *Long View*, which focused on risks and uncertainty over a 20-year period. This initial attempt at scenario work led to increased interagency communication and information sharing across the organization. Later in 2003, *Long* View was replaced by Project Evergreen. Capitalizing

on the strengths of *Long View*, Evergreen took things further to ensure the results affected strategic intent. (Tingstad et al. 2020)

The 2003 scenarios focused on high level drivers – "forces for change." From these, they formed five plausible scenarios. Unlike Long View, these scenarios informed USCG strategy, including discussion of alternative futures in the agency's published 2007 strategy document.[v] Further, output from the Evergreen scenario work also made its way to the Commander's Intent Action Orders, which was put out by then USCG Commandant Admiral Thad Allen.

For the Coast Guard, foresight via scenario-based planning has been a staple for over two decades and continues today. The agency completed its four-year cycle of Project Evergreen V in November 2022 and is now working on the next iteration of its foresight plans through Project Evergreen VI. (Kelley and Schulman 2023) One key innovation in Project Evergreen V was the development of a strategic foresight game, *Paratus Futurum*, that helped to facilitate discussions about long-term strategies. As the RAND report on Evergreen V noted, "Paratus Futurum focused at a strategic level on USCG's roles, missions, available resources, and potential adjustments to those resources through 2040 and beyond. The game's design forced players to make distinct choices about prioritizing missions and investments to prepare for an uncertain future when climate change, technological advancements, the economy, and the global competition for power all shape USCG demand." (Davenport et al. 2022)

By now, it is clear that foresight is deeply embedded into the work of the U.S. Coast Guard. In a recent interview, [vi] Zachary Schulman, Director of Strategic Foresight for the USCG indicated that the Paratus Futurum strategic game would be incorporated into the Service's training curriculum, and that the USCG would be conducting deeper explorations of novel

strategic risks, including "Space Governance, Antarctica, Seabed Security, and Grey Zone Competition, which will be used to develop strategic guidance for the Service… and development of a wargaming capability for the Coast Guard. Through these efforts, Project Evergreen seeks to strengthen the Coast Guard's ability to be *Semper Paratus* for the uncertainties of many plausible futures." [vii]

The Army Cyber Institute: Guarding Against Strategic Surprise

The Army Cyber Institute (ACI) is the Army's cyber think tank attached and co-located to the United State Military Academy at West Point. The ACI's stated goal is to "guard against strategic surprise" for the United States Army. They are challenged to explore a range of threats to the nation and explore possible solutions. These solutions are briefed to stakeholders across the DoD as well as taught to the students at West Point. It is now taught in such classes as: "*Defense and Strategic Studies", "Systems Engineering and Decision Making", Cyber Risk Management",* informing the next generation of soldiers and leaders.

The ACI has been using foresight and Threatcasting to explore a wide range of possible and potential threats to national security and the military fighting force. Their unclassified reports (https://cyber.army.mil/Work-Areas/Threatcasting/) range from threats from terrorists to supply chains, the weaponization of Artificial Intelligence, the definition of Digital Weapons of Mass Destruction (with NATO*)* as well as Microtargeting and 6G (with the U.S. Secret Service). The corpus of this work is now cited by the ACI as a base-level understanding for these multiple and shifting national defense issues. Furthermore, it has informed other bodies

of work including *NATO's Strategic Foresight Assessment 2023 and Future Operating Environment Study.* The defense Intelligence agency uses the method as a part of their intelligence analyst tool and the defense industrial base uses the work as the basis for cross functional collaborations. Finally, the work is taught at other universities such as: University of Texas, Naval Postgraduate School, Norwich University Applied Research Institutes, Columbia University, George Washington University.[viii]

The robust and detailed outputs from these foresight exercises have led to a multi-year engagement enabling city managers and planners to better prepare for possible infrastructure and civil attacks. (Jack Voltaic: https://cyber.army.mil/Research/Jack-Voltaic/JV-Media/) Results have informed the training for the future fighting forces as well as strategic planning for USCYBERCOM. The year over year use of these tools has placed the ACI as a strategic leader for futures thinking and action inside the Army as well as opening a wide range of new partners and collaborators to solve "whole of nation" problems.

PRACTICAL NEXT STEPS ON FORESIGHT ADOPTION

Engaging in strategic foresight for institutional and organizational planning is easier than ever. The last decade has seen an explosion of interest and utilization of foresight methods, and this has prompted efforts to make foresight more readily accessible to a wider range of audiences. Thus, even as specialized journals in foresight continue to push the boundaries of methods such as scenario-based planning, narrative foresight, and Future Design, we have also seen the development of pragmatic toolkits and resource guides by entities such as the United Nations, the United Kingdom, and the School of International Futures (United Nations

Development Programme 2022; UNICEF 2023; UK Government Office for Science 2024; Glenday et al. 2023; Shepherd et al. 2023). Given these lower barriers to entry, researchers and practitioners in public administration would benefit significantly from learning and applying basic forms of foresight techniques to be better prepared for various plausible futures confronting their areas of jurisdiction and interest.

Our calls to action from practitioners and researchers alike are the following:

1. Learn and apply – Learn from the freely available toolkits and resource guides mentioned in this article and find a way to apply at least one foresight method in your work. Foresight methods range in their level of complexity and resource commitments, and there are several ways for public agencies to "dip their toes" in the waters of foresight work, and to build greater interest, capacity, and legitimacy for foresight methods among a range of audiences.
2. Join a foresight community focused on policy and practice –The Federal Foresight Community of Interest (www.ffcoi.org) is made up of government employees and contractors looking to share best practices and advance foresight in the US Government. The FFCOI is free to join, has free monthly webinars, an annual in-person event in the metropolitan Washington, DC area, and provides free monthly newsletters. Practitioners can also benefit from resources shared by FFCOI via their LinkedIn account.
3. Explore collaborations between researchers and public agencies – We encourage researchers and practitioners alike to build stronger bridges across sectors. Just as the practice of public administration can benefit from new research developments that

have practical application, researchers can also benefit from making sure that their work has greater visibility and impact. Examples of strong collaborations between academic researchers and public agencies abound across the world, including those connected with Arizona State University (Arizona State University 2024), the Maxwell School at Syracuse (Syracuse University 2024), and various Future Design efforts in Japan (Brooks Masters and Ramakrishnan 2024).

4. Advocate for greater foresight capacity in public agencies – There are growing efforts to push for greater foresight capabilities in the U.S. federal government (Federal Foresight Advocacy Alliance at FFAA-us.org) and in various international agencies such the United Nations (School of International Futures and Foundations for Tomorrow 2024). Researchers and practitioners alike can inform and add momentum to these collaborative efforts, increasing supply as well as demand for the adoption of strategic foresight in public agencies.

REFERENCES

Arizona State University. 2024. "Julie Ann Wrigley Global Futures Laboratory." Julie Ann Wrigley Global Futures Laboratory™. 2024. https://globalfutures.asu.edu/.

Brady, Henry E., and Aditi Chugh. 2023. "Why Public Policy Schools Should Teach Foresight and Futures Studies: A California 100 White Paper." Berkeley, CA: University of California.

Brooks Masters, Suzette, and Karthick Ramakrishnan. 2024. "The Promise of Future Design: Using Intergenerational Role Play and Negotiation to Improve Planning and Decision-Making? And Become Better Ancestors." London, UK: School of International Futures. https://soif.org.uk/app/uploads/2024/05/Future-Design_FINAL_v11.pdf.

California 100 Initiative. 2023. "The California We Seek: Vision & Roadmap for the Next Century." https://vision.california100.org/.

Collins, James C., and Jerry I. Porras. 1996. "Building Your Company's Vision." *Harvard Business Review* 74:65–78.

Dalkey, Norman C., Bernice B. Brown, and Samuel Cochran. 1969. *The Delphi Method: An Experimental Study of Group Opinion*. Vol. 3. Rand Corporation Santa Monica, CA.

Davenport, Aaron C., Michelle D. Ziegler, Susan A. Resetar, Scott Savitz, Katherine Anania, Melissa Bauman, and Karishma McDonald. 2022. "USCG Project Evergreen V: Compilation of Activities and Summary of Results." RAND Corporation. https://www.rand.org/pubs/research_reports/RRA872-2.html.

Dreyer, Iana, and Gerald Stang. 2013. "Foresight in Governments–Practices and Trends Around the World." *Yearbook of European Security* 1368 (1): 7–32.

Glenday, Peter, Karthick Ramakrishnan, California 100, and School of International Futures. 2023. "Beyond Strategic Planning: A Foresight Toolkit for Decision Makers." Berkeley, CA: University of California. https://california100.org/a-toolkit-for-policy-educators/.

Government of Wales. 2015. "Well-Being of Future Generations (Wales) Act 2015 – the Future Generations Commissioner for Wales." 2015. https://www.futuregenerations.wales/about-us/future-generations-act/.

Groves, David G., Nidhi Kalra, James Syme, Edmundo Molina-Perez, and Chandra Garber. 2021. "Water Planning for the Uncertain Future: An Interactive Guide to the Use of Methods for Decisionmaking Under Deep Uncertainty (DMDU) for U.S. Bureau of Reclamation Water Resources Planning." RAND Corporation. https://www.rand.org/pubs/tools/TL320.html.

Hara, Keishiro, Masashi Kuroda, and Yutaka Nomaguchi. 2023. "How Does Research and Development (R&D) Strategy Shift by Adopting Imaginary Future Generations? – Insights from Future Design Practice in a Water Engineering Company." *Futures* 152 (September):103221. https://doi.org/10.1016/j.futures.2023.103221.

Hara, Keishiro, Ritsuji Yoshioka, Masashi Kuroda, Shuji Kurimoto, and Tatsuyoshi Saijo. 2019. "Reconciling Intergenerational Conflicts with Imaginary Future Generations: Evidence from a Participatory Deliberation Practice in a Municipality in Japan." *Sustainability Science* 14 (6): 1605–19. https://doi.org/10.1007/s11625-019-00684-x.

Johnson, Brian David, Natalie Vanatta, and Cyndi Coon. 2021. "Threatcasting." In *Threatcasting*, 3–12. Springer.

Kelley, Ryan, and Zachary Schulman. 2023. "Coast Guard Completes Evergreen V Strategic Foresight Report." *United States Coast Guard* (blog). January 9, 2023. https://www.mycg.uscg.mil/News/Article/3258843/coast-guard-completes-evergreen-v-strategic-foresight-report/https%3A%2F%2Fwww.mycg.uscg.mil%2FNews%2FArticle%2F3258843%2Fcoast-guard-completes-evergreen-v-strategic-foresight-report%2F.

Lempert, R. J. 2019. "Robust Decision Making (RDM)." In *Decision Making under Deep Uncertainty: From Theory to Practice*, edited by Vincent A. W. J. Marchau, Warren E. Walker, Pieter J. T. M. Bloemen, and Steven W. Popper, 23–51. Cham: Springer International Publishing. https://doi.org/10.1007/978-3-030-05252-2_2.

Lindgren, Mats, and Hans Bandhold. 2009. *Scenario Planning-Revised and Updated: The Link Between Future and Strategy*. Springer.

Monteiro, Rodrigo Dal Borgo, Bruno. 2022. "The Triple Challenge of Embedding Strategic Foresight in Government." *Observatory of Public Sector Innovation* (blog). October 13, 2022. https://oecd-opsi.org/blog/triple-challenge-of-strategic-foresight/.

OECD. 2024. "Strategic Foresight." OECD. 2024. https://www.oecd.org/en/about/programmes/strategic-foresight.html.

Rowland, Nicholas J., and Matthew J. Spaniol. 2022. "The Strategic Conversation, 25 Years Later: A Retrospective Review of Kees Van Der Heijden's Scenarios: The Art of Strategic Conversation." *Futures & Foresight Science* 4 (1): e102. https://doi.org/10.1002/ffo2.102.

Saijo, Tatsuyoshi. 2020. "Future Design: Bequeathing Sustainable Natural Environments and Sustainable Societies to Future Generations." *Sustainability* 12 (16): 6467. https://doi.org/10.3390/su12166467.

Saritas, Ozcan, and Jack E. Smith. 2011. "The Big Picture–Trends, Drivers, Wild Cards, Discontinuities and Weak Signals." *Futures* 43 (3): 292–312.

School of International Futures and Foundations for Tomorrow. 2024. "The Pledge Network." Foundations for Tomorrow. 2024. https://www.foundationsfortomorrow.org/statement-of-ambition.

Schultz, Wendy L. 2006. "The Cultural Contradictions of Managing Change: Using Horizon Scanning in an Evidence-Based Policy Context." *Foresight* 8 (4): 3–12.

Shell Global. 2024. "Meet the Shell Scenarios Team." Shell Global. 2024. https://www.shell.com/news-and-insights/scenarios/meet-the-shell-scenarios-team.html.

Shepherd, Ellen, Peter Glenday, Karthick Ramakrishnan, and California 100. 2023. "A Foresight Toolkit for Policy Educators." Berkeley, CA: University of California. https://california100.org/a-toolkit-for-policy-educators/.

Singapore National Climate Change Secretariat. 2014. "Sustainable Singapore Blueprint." https://www.nccs.gov.sg/media/publications/sustainable-singapore-blueprint/.

Syracuse University. 2024. "Carnegie-Maxwell Policy Planning Lab." Maxwell School. 2024. https://www.maxwell.syr.edu/research/moynihan-institute-of-global-affairs/multidisciplinary-research-projects-and-programs/carnegie-maxwell-policy-planning-lab.

Tingstad, Abbie, Michael T. Wilson, Katherine Anania, Jordan R. Fischbach, Susan A. Resetar, Scott Savitz, Kristin Van Abel, et al. 2020. "Developing New Future Scenarios for the U.S. Coast Guard's Evergreen Strategic Foresight Program." RAND Corporation. https://www.rand.org/pubs/research_reports/RR3147.html.

UK Department for Environment, Food and Rural Affairs. 2010. "Food 2030." Government of United Kingdom. https://webarchive.nationalarchives.gov.uk/ukgwa/20130402141656/http://archive.defra.gov.uk/foodfarm/food/pdf/food2030strategy.pdf.

UK Government Office for Science. 2023. "Foresight Projects." GOV.UK. April 6, 2023. https://www.gov.uk/government/collections/foresight-projects.

———. 2024. "Futures Toolkit for Policymakers and Analysts (Updated Edition)." GOV.UK. July 11, 2024. https://www.gov.uk/government/publications/futures-toolkit-for-policy-makers-and-analysts.

UNICEF. 2023. "Designing a Youth-Centred Journey to the Future | Innocenti Global Office of Research and Foresight." https://www.unicef.org/innocenti/reports/designing-youth-centred-journey-future.

United Nations. 2024. "UN Futures Lab." UN Futures Lab. 2024. https://un-futureslab.org/.

United Nations Development Programme. 2022. "UNDP Regional Bureau for Asia and the Pacific Foresight Playbook." https://www.undp.org/asia-pacific/publications/undp-rbap-foresight-playbook.

Van der Heijden, Kees. 1996. *Scenarios: The Art of Strategic Conversation*. Chichester, England : New York: John Wiley & Sons.

———. 2011. *Scenarios: The Art of Strategic Conversation*. John Wiley & Sons.

Walker, Warren E., Poul Harremoës, Jan Rotmans, Jeroen P. Van Der Sluijs, Marjolein BA Van Asselt, Peter Janssen, and Martin P. Krayer von Krauss. 2003. "Defining Uncertainty:

A Conceptual Basis for Uncertainty Management in Model-Based Decision Support." *Integrated Assessment* 4 (1): 5–17.

White House Office of Management and Budget. 2016. "OMB Circular A-11." The White House. 2016. https://obamawhitehouse.archives.gov/node/15299.

———. 2018. "OMB Circular A-11." The White House. 2018. https://budgetcounsel.com/wp-content/uploads/2019/08/2018-omb-circular-a-11-full-june-2018.pdf.

———. 2024. "OMB Circular A-11." The White House. 2024. https://www.whitehouse.gov/omb/information-for-agencies/circulars/.

ENDNOTES

[i] Strategic foresight has been included in guidance on agency strategic plans by the Office of Management and Budget Circular No. A-11 in the Obama, Trump, and Biden administrations (White House Office of Management and Budget 2016; 2018; 2024).

[ii] For an overview of various foresight tools and methods, see Peter Glenday, Karthick Ramakrishnan, California 100, and School of International Futures (2023). *Beyond Strategic Planning: A Foresight Toolkit for Decision Makers*. Berkeley, CA: University of California.

[iii] For more details on these examples, see (Glenday et al. 2023)

[iv] A helpful review of both editions can be found in (Rowland and Spaniol 2022).

[v] "The US Coast Guard strategy for maritime safety, security, and stewardship." U.S. Coast Guard, Jan 30, 2007. "This Strategy is also the product of the Coast Guard's Evergreen Project, which looks across alternative futures to determine robust strategies that best position the Coast Guard and the nation for a changing world." (Executive Summary, page 1)

[vi] Author correspondence with Zachary Schulman, July 2024.

[vii] Author correspondence with Zachary Schulman, July 2024.

[viii] Author correspondence with LTC Jason Brown. July 19, 2024

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